

## Porto's diabetes's prevalence - a good reason to rethink urban planning

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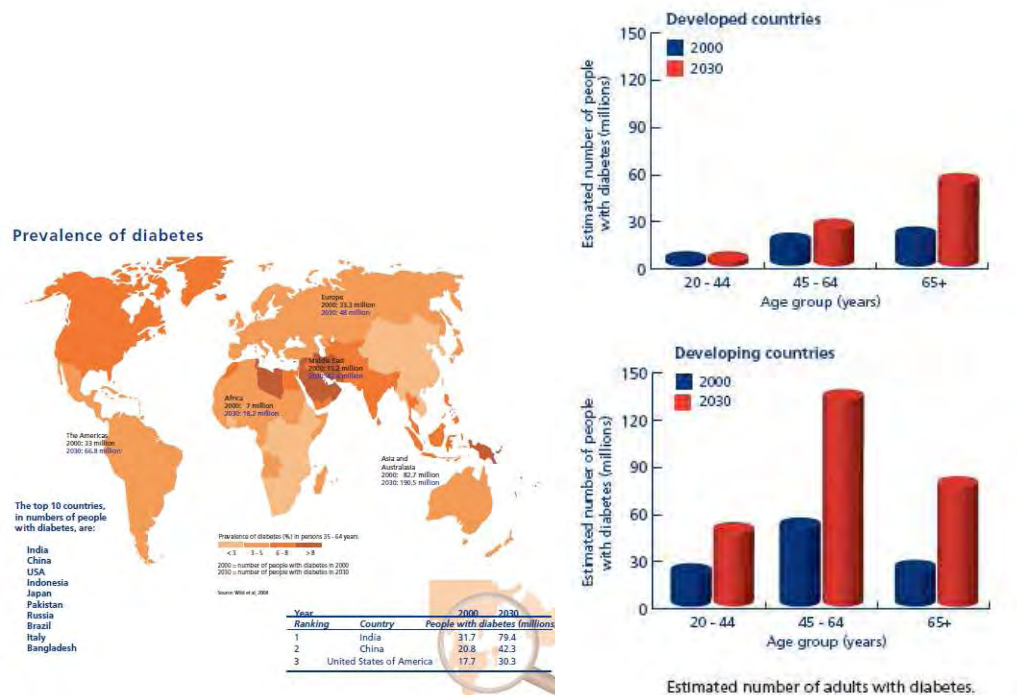
The current Porto's form and structure, resulting from a history of more than 8 centuries, show some dysfunctions that may be materialized, for example, in some health, quality of life and well being indicators. Having in mind some important risk factors for diabetes (type 2) – i.e. life style, diet, physical activity - and the huge increase of this disease in recent years, we collect and analyze the frequency of occurrence and the spatial distribution of diabetes's admissions in Porto's four main hospitals between 2000 and 2007. We conclude that there seem to be, at Porto, some objective and subjective conditions related to urban planning decisions that might help to explain the diabetes's spatial distribution. Looking from a geographical perspective to the Porto's urban supply and demand – biogeophysical, functional, demographic, social and economical – we find an, at least apparent, coincidence between the areas where the relative weight of diabetics is higher and the supply of conditions for the practice of leisure and recreation is of lesser quality and socio-economic status of residents is more fragile (age, income, literacy, etc.) Looking through this data relationship, it seems that Porto's diabetes prevalence may be a good reason to motivate citizens, urban planners and decision-makers to rethink sustainable urban planning policies nowadays.

**Keywords:** Urban Planning; Diabetes (type2); Environment; Social and Economic Condition; Wellbeing

### 1. Introduction

The new millennium urban competitiveness and success implies a multiple purpose and several compound scales city skills approach. Having in mind the preference increase of urban way of life, these new puzzle should include the needs to accommodate more people and activities without losing any of its advantages. The attractiveness of a city depends of some key factors like investment opportunities, employment, safety, cultural and educational dynamic, aesthetic values, development choices, affordable housing, services, accessibility, environmental quality, freedom, human scale built environment, etc.. Within these enlarged framework, health, quality of life and well being indicators are efficient ways of rethinking planning goals towards a new puzzle concept.

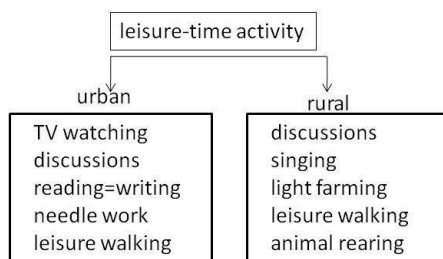
Considering that the *diabetes mellitus* is one of the diseases whose aggravation depends of physical activity, diet, stress and lifestyle in general, that has had a huge increase in urban areas during the last decades (Fig.1), we propose an analysis of the spatial Porto's diabetes's prevalence as a way to face urban planning goals in a medium size city.



**Figure 1.** Prevalence of Diabetes - global view and projections in developed and developing counties. Source: WHO, 2009.

As far as WHO conclude in its reports, the diabetes-type 2 great increase seems to be a consequence of a spread of an westernized lifestyle around the planet with a lot of nutritional mistakes, over nutrition and a lack of physical activity. According to Wild et al (2004) the number of cases of diabetes worldwide in 2000, among 20 years of age's adults was estimated to be about 171 million.

The urban lifestyle together with westernization of societies, means that citizens spent, in average, twice the time used by rural people in leisure activities but the metabolic rate is significantly higher in rural people than in urban citizens (Fig. 2). While the rural typical leisure activities include several energy consumption actions, several spare time and recreational activities in urban areas have no significant metabolic rates.



**Figure 2.** Leisure activities in rural and urban lifestyle.

## 2. Methods

The accomplishment of our work began with the collection and analysis of temporal and spatial distribution of diabetes in the Metropolitan Porto Area (GAMP) and in Porto. We collected the data of daily hospital admissions in the four main hospitals in the GAMP (St. John, St. Anthony, Santos Silva and Pedro Hispano) between 2000 and 2007.

In this exercise we started by analyzing the relative importance of diabetes-type2 when compared with the total number of admissions during the same period. Afterwards, we confirm the relative high weight of this pathology in the resident population (Table 1 and 2).

**Table 1.** Total admissions and admissions with diabetes in Porto 4 major hospitals (2000-2007)

	Inhab.	Admissions Total	Admissions Diabetes
<b>Porto</b>	<b>263131</b>	<b>178841</b>	<b>19652</b>
<b>GAMP</b>	<b>1551950</b>	<b>820193</b>	<b>77117</b>

**Table 2.** Rate of diabetes admissions per total of admissions and per inhabitant (2000-2007)

	Diabetes/ Admissions	Diabetes/In hab.
<b>Porto</b>	<b>11%</b>	<b>7,50%</b>
<b>GAMP</b>	<b>9,4%</b>	<b>5,0%</b>

In the next step we tried, using a GIS, to assess, simultaneously, the spatial distribution of some biogeophysical, social and economic data and the highest values of diabetes's prevalence in Porto.

## 3. Results and discussion

Having in mind that the people more vulnerable to be a diabetes type 2 victim are those older than 45 years, or that had diabetes during a previous pregnancy, or that have excess body weight (especially around the waist), or with a low activity level (exercising less than 3 times a week), or with a metabolic syndrome or with a family history of diabetes, or a baby born weighing more than 4kg, or with HDL cholesterol under 35 mg/dL, or with high blood levels of triglycerides, a type of fat molecule (250 mg/dL or more), or with high blood pressure (greater than or equal to 140/90 mmHg), and reminding also that as a chronic disease, diabetes is well supervised by the patient himself and only a few number of cases need care at an emergency room and even a lower number need to be admitted in an hospital, we look to the density of admission cases in the GAMP and at Porto (Fig. 3). Considering international and WHO patterns, we determined that diabetes admission values above 7% of inhabitants are exceptionally serious (Fig.4).



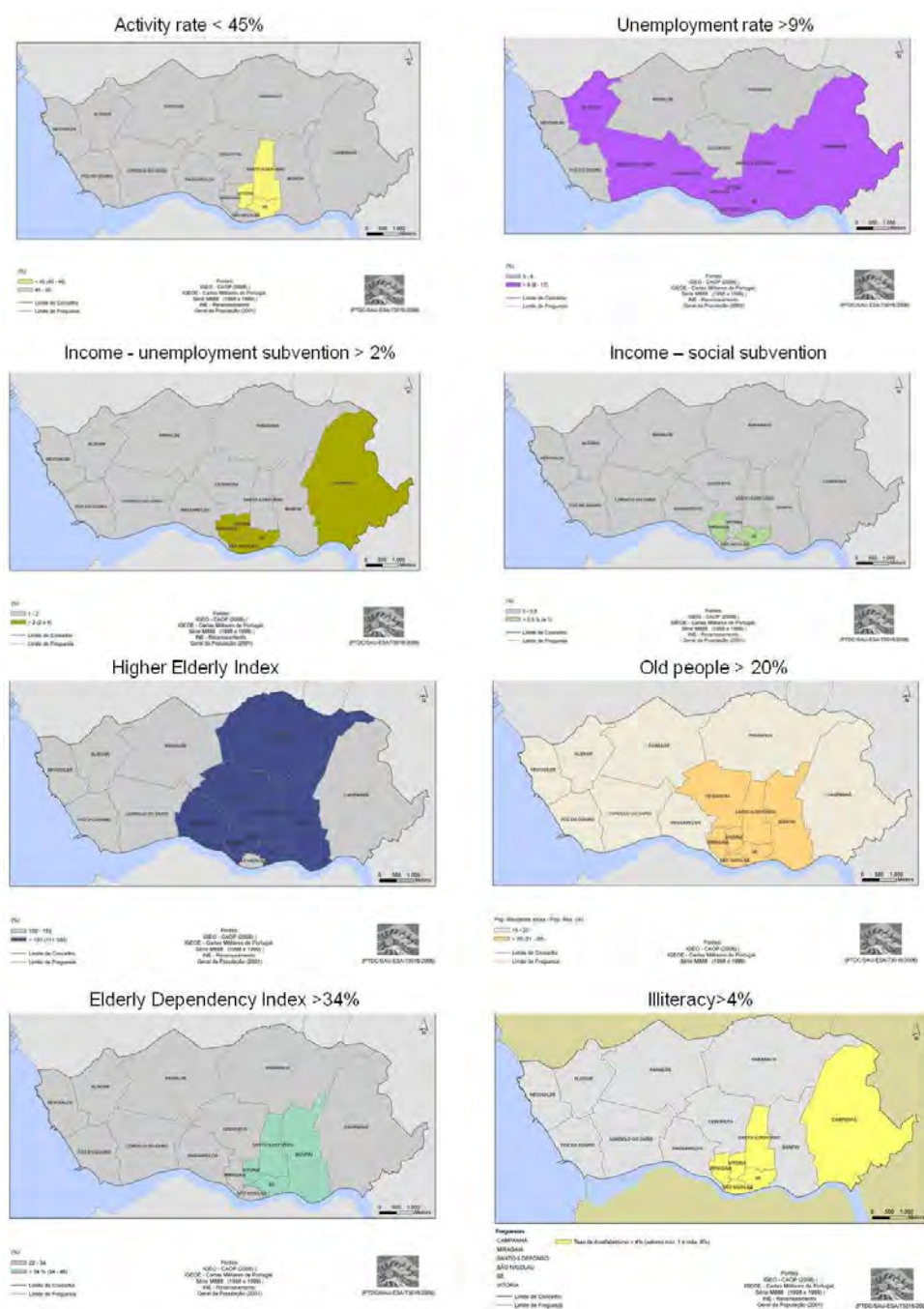
**Figure 3.** Distribution of diabetes admissions in GAMP and Porto from 2000 to 2007 (% inhabitants).



**Figure 4.** Distribution of the highest rates of diabetes admissions in Porto (> 7% of inhabitants).

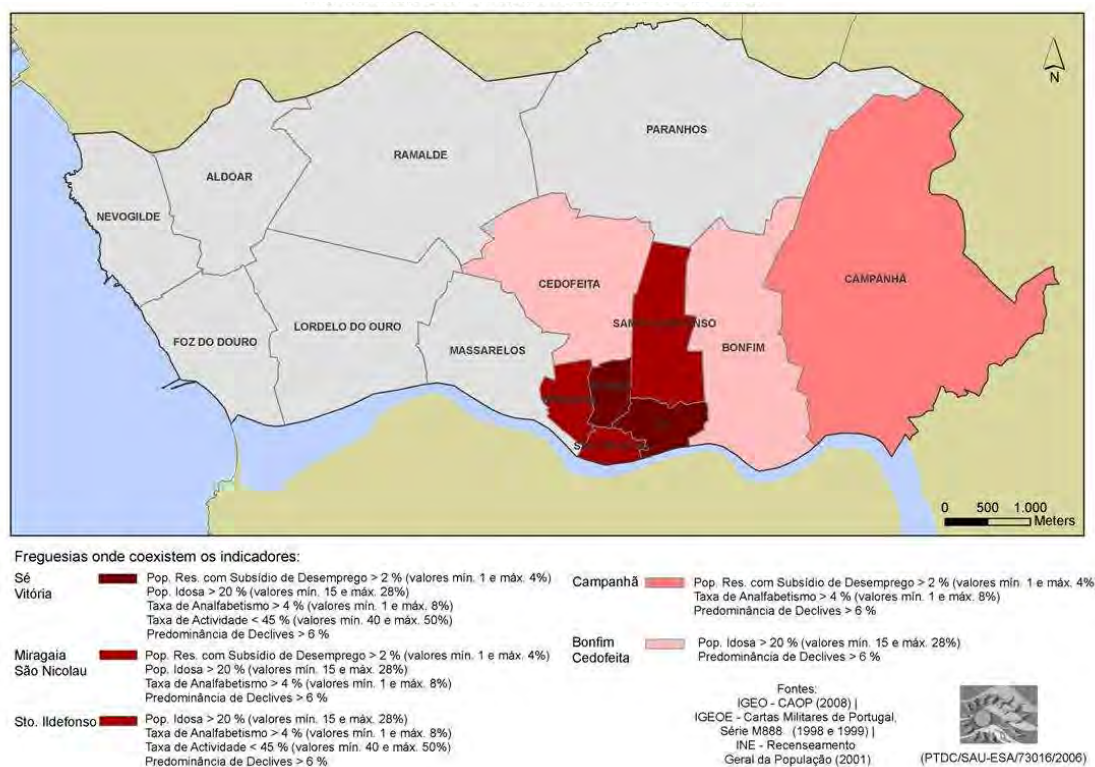
The NE and the old and central parishes of Porto are the areas with a higher density of acute diabetes-type 2 cases that needed to be attended and admitted in one of the four main hospitals (Fig. 4).

Having seen these we used a GIS tool to appreciate and compare the spatial incidence of diabetes and some social, cultural economic characteristics of each of the Porto parishes (Fig.5 and Fig. 6).



**Figure 5.** Some social and economic indicators that might determine diabetes prevalence at Porto.





**Figure 6.** Social and economic indicators incidence at Porto.

Considering the results obtained we realize that the major diabetes incidence coincides with the parishes with: i) people living with unemployment subvention > 2% (1%-4%); ii) old people > 20% (15%-28%); iii) Illiteracy rate > 4% (1%-8%); iv) activity rate < 45%; v) slopes > 6%

## 4. Conclusion

The diabetes's prevalence at Porto seem to be a very good reason to rethink urban planning policies because the rate of success of the disease treatment experiences show that may it might be achieved either with pharmacology and/or lifestyle changes. But the urban lifestyle modifications depends upon induced and objective factors. As we saw at Porto the areas with the worse or careless neighbourhoods, the least aesthetic qualified, those with less usable green areas, with none or bad walking conditions, with less safety, or those more inaccessible and with less outdoor climate comfort conditions are the ones with more diabetes's admission rates. The parishes with lowest incomes rates, with highest illiteracy, with lowest activity rate and with high elderly dependency are also the ones where the diabetes's prevalence is higher. There are other objective factors like genetics, diet, sport facilities, etc. that we didn't evaluate are also very important to understand the disease aggravation. Anyhow we can consider the knowledge of the behaviour patterns of each socio-economic groups to support the narrow relationship between socio economical and environmental injustices and health inequities.

Within this complex sketch inside a city, the urban planners are supposed to know the social and cultural backgrounds diversity and the variety of solutions that have to be available to change wellbeing patterns. It is not worthwhile just ensure better conditions to provide employment, security, environmental quality, leisure and recreation spaces, education and health facilities, it is needed a much more holistic approach to the existent resources and human beings in order to transform those ingredients in healthier objective planning options.

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